DOCUMENT RESUME

ED 252 121 HE 017 949

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TITLE Improving Academic Consortium Effectiveness through Computer Usage: A Status Report and a Proposal.
SPONS AGENCY Carnegie Corp. of New York, N.Y.
PUB DATE Nov 84
NOTE 67p.; Report prepared in cooperation with the Council for Interinstitutional Leadership. Appendix E was not included in the document received by ERIC.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Computer Literacy; *Computer Oriented Programs; Computer Software; *Consortia; Efficiency; Higher Education; *Inservice Education; *Management Information Systems; *Program Administration; Program Costs; Questionnaires
IDENTIFIERS Decision Support Systems

ABSTRACT

The extent to which 37 academic consortia were using or were capable of using computers to improve operations was surveyed, and potential applications of computers were identified. Attention was also directed to equipment availability, staff knowledge of computer software, and the possibility that a training and applications effort could be pursued. Potential applications of computers to assist in five consortial managerial functions and three major types of computer information systems that assist in these managerial tasks were addressed. Computer-based models appropriate to consortia, obstacles to computer usage, and fourth generation tools were also assessed. The survey report includes various tables and graphs that illustrate the information that can be generated by computer programs, along with a proposal for applying computer technology to consortium administration. The proposal considers program objectives and design, training, project costs, and computer hardware and software. Appendices include: the survey questionnaire, a list of potential cooperative computer-related programs, a sample computer project budget, a summary of survey responses, and a selected bibliography on decision support systems. (SW)

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IMPROVING ACADEMIC CONSORTIUM EFFECTIVENESS THROUGH COMPUTER USAGE: A STATUS REPORT AND A PROPOSAL

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NOVEMBER 1984

NE 017949

Funded in part with funds from the Carnegie Corporation under a grant to the Associated Colleges of the St. Lawrence Valley.

IMPROVING ACADEMIC CONSORTIUM EFFECTIVENESS
THROUGH COMPUTER USAGE:
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A. Potential Cooperative Computer-Related Programs
B. Survey Questionnaire
C. Project Budget
D. Summary of Responses
* E. Resume for Dr. Fritz H. Grupe
F. Selected Bibliography on Decision Support Systems

*Appendix E was not included with this document as received by ERIC.

IMPROVING ACADEMIC CONSORTIUM EFFECTIVENESS THROUGH COMPUTER USAGE: A STATUS REPORT AND A PROPOSAL

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I. COMPUTERS AND ACADEMIC CONSORTIA

A. PAST RELATIONSHIPS

Except for a flurry of experimentation funded by the National Science Foundation with hardware-based, computer networks in the 1960s, the concept of the multipurpose consortium has not been aligned with computer cooperatives very often. It is odd that many computer cooperatives emerged independent of existing multipurpose consortia. As a consequence, the computer cooperatives were not reinforced by the relationships and resources of consortia. And vice versa, consortia were not aided by the availability of a base of communications and by the resources of computer cooperatives that were made available by newer information technologies.

This generalization is not, of course, entirely accurate. Some consortia have mounted effective, valuable joint ventures in the field of computing. Among the most fruitful kinds of ventures have been:

1. Joint Computer Center. By operating a single computer system, a consortium can provide academic and administrative computing efficiently and effectively in some, though not all, circumstances. Geographic proximity and small institutional member size seems to encourage the development of such centers.

2. Faculty Development. Few areas of staff development have generated the interest created by computer applications in the disciplines. Many consortia have offered workshops, conferences and long-term training programs for faculty in programming, statistical processing, text processing, computer modelling and simulation, and in the discipline-specific aspects of computer usage. Staff retraining for teaching computer courses is also being tried.

3. Software Sharing. Projects have been undertaken to aid faculty in sharing software. Frequently this has been associated with a staff development project since the sharing of computer applications requires an understanding of how data is manipulated and how models function. However, some projects have been aimed at locating, screening, selecting and disseminating high-quality software materials for academic usage.

4. Computer System Sharing. Although a few consortia have actually operated independent computer centers, most do not. More progress has been made in enabling colleges to draw upon the resources resident at one of several cooperating campuses. Telecommunications systems of various types make it possible for colleges to draw upon high cost software packages and the

large memory-high speed processors located at major institutions within a consortium.

5. Potential Areas. Interinstitutional cooperation can address other kinds of projects which have not received much attention. Some of the still relatively under-developed areas are described in Appendix A.

B. CONSORTIUM OBJECTIVES

The projects which have involved consortia in the joint usage of computer technologies are concrete examples of how consortia function in reaching their special goals.

1. To expand their students' educational opportunities.
2. To share resources.
3. To avoid needless duplication.
4. To make the best use of resources.
5. To innovate through joint action.

But the sharing of computer resources among cooperating colleges is not the only perspective from which relationships between computers and consortia can be viewed. It is not the primary perspective of this report. Consortia can use computers to meet their own ends and to support the achievement of their own goals. At the inception of this study there had been no assessment of the extent to which computers have been, or could be better, applied to the solution of consortium problems. Consequently, this study was undertaken.

II. A SURVEY OF CONSORTIA AND COMPUTERS

A. PURPOSE

A survey questionnaire was sent to 56 selected, multi-purpose consortia in May of 1984. The basic purpose of this questionnaire (Appendix B) was not to develop a comprehensive listing of consortial projects using computer technologies. Rather, the purpose was to determine the extent to which representative consortia are now using or are capable of using computers to improve their own operations. In Section I brief mention was made the kinds of consortial projects and programs which consortia have found effective for their members. To what extent are consortia drawing on computers to strengthen their own abilities to gather and analyze data? Do they have the equipment, and do their staff have the training and experience to know how to productively use appropriate hardware and software systems? Are consortium staff interested in, and capable of, supporting an inter-consortium staff development project which introduces sophisticated computer usage into consortium decision-making?

B. RESPONSES: APPLICATIONS

The questionnaire which was utilized and a consortium-by-consortium listing of responses (Appendix D) is appended. Five of the questionnaires were returned "addressee unknown." There were 37 responses (a return of 73%) indicating a high interest in the questions posed.

The first question sought to determine the level of computer usage in consortium central offices. A total of 23 consortia (62%) have begun making use of word processors. Closely related to word processing is mailing list generation, which is conducted by 19 (51%) of the consortia.

Financial accounting on the computer was also available to 19 consortia, presumably most of these applications were on mainframe computers.

Considerably fewer consortia indicated that they made use of the computer for analytic purposes. Only 7 (19%) found cause to use computers for doing institutional research and analysis. Even fewer (6 - 16%) consortia used computers to maintain and analyze cross registration records, records on a program which is basic to most consortia. Similarly, 8 organizations (22%) noted that statistical packages were used.

Six consortia (16%) had used data base management systems, while 14 (38%) had used a spreadsheet package. Six consortia had used computer generated graphics for information display.

Perhaps the most sophisticated usage of computers listed, typesetting, brought only 4 (11%) positive responses. Three consortia noted uses other than those listed.

Although two consortia had indicated totals of 10 and 11 applications, twelve consortia (32%) had not used computers for even one application. Sixty percent of the consortia had 3 or fewer applications. **When word processing and financial accounting are eliminated from the statistics, computer-based applications are few indeed.**

C. RESPONSES: EQUIPMENT AVAILABILITY

The respondents were asked to identify the computer equipment they had. The results were as follows:

Equipment	No.	%
Word Processor	19	51%
Terminal	18	49%
Printer	20	55%
Plotter	3	8%
Microprocessor	13	35%
Modem	12	32%

Only 13 (35%) of the respondents expressed the opinion that their current level of equipment has not limited their access to computer resources for their applications. Alternatively two-thirds did experience a restriction.

Most of the consortia (27 - 73%) have access to a mainframe computer if they choose to utilize it. However, nearly half (17 - 46%) note that they would be charged for these services (if the mainframe provided appropriate software).

D. RESPONSES: STAFF KNOWLEDGE

The consortium respondents were asked about their knowledge of computer software. Only 3 (8%) consortium directors had ever taken a course in computing, although 11 consortia (30%) had staff other than the director who had taken at least one course.

When asked about their familiarity with selected types of software, the consortium staff noted the following levels of familiarity:

Software	No.	%
Higher level language	14	38%
Planning language	12	32%
Data base mgt. system	9	24%
Statistical package	3	8%

Looked at differently, 15 directors (41%) had no knowledge of software in these categories. An additional 8 (22%) had knowledge of only one type of software. Four persons (11%) were familiar with 2 types of software and ten (27%) were familiar with 3 or more. If one assumes that knowledge of a higher level language is unlikely to be used by a consortium administrator because of the time and complexity attendent to sophisticated programming, 19 directors (51%) have no detailed knowledge of a suitable computer application system.

Therefore, few directors and/or other staff are able to identify, much less implement, a computer application that would facilitate the solution of their problems.

E. RESPONSES: POSSIBLE PROJECT PARTICIPATION

A final set of questions were posed on the possibility that external funding might be sought to sponsor a consortium staff development effort focussing on the use of computers for consortium administration.

Asked whether they would be willing to participate in a training project lasting as much as 10 days, nineteen persons (51%) said they would and 13 (35%) didn't know. Presumably the latter group would do so if the training was scheduled at an appropriate time of the year. Only 5 persons indicated no interest in participation. Several directors indicated that they did not wish to participate because, as their responses underscored, they were already using computers effectively.

The respondents were asked whether their consortium could provide up to $750 in matching funds for travel. Sixteen (44%) answered affirmatively. Three (8%) didn't know whether this was possible. Eighteen (48%) said their consortiums could not.

Eleven consortia (30%) could provide up to $2500 for equipment, while 10 (27%) could not do so. Sixteen (44%) didn't know.

Twenty-seven respondents (73%) said that beyond training participation, they would be willing to share information about computer usages they develop with

other project participants. Three persons did not wish to join in and seven didn't know what their level of participation might be.

The responses were clearly supportive of the possibility that a training and applications development effort could be mounted.

III. POTENTIAL AREAS FOR COMPUTER USAGE

A. LEVELS OF COMPUTING

Consortia are uniquely shaped by the nature of the institutions they enroll as members, by the geographic distribution of the colleges they serve, by the personalities of key individuals involved, by the budget with which they operate, and many other characteristics often cited in the literature. Despite the many individualizing features of such organizations, consortia also have much in common. Though not all consortia maintain cross registration programs, many do. Many consortia support joint purchasing arrangements. Virtually all consortia must of necessity develop project planning documents and proposals to funding agencies and to their member colleges.

Computer-based planning procedures can be useful in many of these contexts even though most consortia have had little experience in this. As is true of all managers, consortium managers have five basic functions to perform. These tasks can be separated into five categories: planning, controlling, directing, organizing and evaluating.

Planning considers the future of the organization and its programs. What are its purposes to be? How do these differ from the purposes currently held? Is there agreement on the implications particular goals have for the members? Are projections of costs and benefits supportive of institutional goals?

Organizing involves the assembling of personnel and monetary resources needed to support the achievement of the consortium's goals and objectives. This includes the integration of resources available on the member campuses as well as those specifically designated for consortium use. Institutional presidents and other campus managers must assist in the organizational effort. Time schedules, implementation plans and written plans must be prepared and distributed. Meetings must be held to explain new undertakings and to motivate participants.

Directing requires that the resources assembled be fashioned into an effective operational framework and operating process. Individuals need to know when and where their services are needed, what their responsibilities are. Specific lines of authority must be in place and functioning. Project leaders must understand their role and scope of influence.

Controlling implies that a project does not follow totally pre-determined directions, but must be adapted periodically as conditions change and the impact of developments taken thus far are better understood. Changes in the use of fiscal resources may be needed. More publicity, less investment in personnel, revision in the expectations of project leaders as to the realism of adopted goals are representative of the kinds of controls that must be accepted.

Evaluating is a key function of program administrators, not only at the end of a project or activity, but throughout the life of a program. Evaluation implies that measurable goals and objectives exist. Against these objectives concrete milestones can be used to see whether costs are in line with expectations, whether the correct distribution of responsibility exists, and whether time lines are being adhered to. It is also necessary to establish functional bases on which to determine whether the goals and objectives are being achieved.

Many, perhaps most, of the activities of a consortium director will not require computer-based, information. This is true of all managers. However, computers can be used a good deal more effectively in the same ways that they have been employed in other organizations and on the member campuses. Generally computer information systems have been grouped into three major categories which provide assistance in all five managerial tasks.

1. **Operational data systems** (EDP) -- Systems that focus on the collection, recording and retrieval of specific data regarding individual transactions, events and entities. This might include such systems as those used to support the preparation of mailing lists, departmental accounts, class lists, work orders, etc. Information about the transactions being described can be characterized as being repetitive and predictable, highly structured, and the reports desired are generally known to be required at particular points in time. EDP also addresses itself to relatively short term decisions and is most often used by lower level staff and administrators.

   For instance, in the consortium setting cross registration cards are collected during institutional registration times, processing takes place immediately thereafter so each campus has a list of students coming in and going out of that school for courses. Similarly, check registers are updated and accounts are reconciled monthly, quarterly and yearly. Audits are made at the end of the fiscal year.

   Each of the operational level systems involves the accurate recording of data in highly structured routines. All of the data is collected by the organization through internal procedures.

2. **Management information systems** (MIS) -- Systems that aggregate or analyze the operational data assembled. This might include the development of program costing data, space utilization reports, faculty-to-student load ratios, etc. Again, most systems in this category are, or become, repetitive and predictable. Federal forms appear annually. The problems dealt with by MIS are tactical in nature. Deans call for class grade distribution lists after each semester is completed. MIS reports tend to be used for middle-time ranges (6 months to 1 year) and are employed to allocate and control institutional expenditures.

   One consortium director might prepare aggregate summaries of the usage of films by each institution or ridership statistics on a bus system. The director might issue analyses on the flow of books and periodicals through an inter-library loan program. Another director might develop analyses of the utilization of computer resources by institution, or the effectiveness of joint student recruitment activities.

The availability of a management information system requires that the data assembled at the operational level be accurate and complete since MIS systems rely on this data almost completely. MIS systems may require that operational data held in different file systems must be integrated in new ways. They do not, however, typically require any data external to the organization.

Computerized management information and operational data systems are usually built around what are generically known as third generation programming languages such as Fortran and Cobol. Use of these languages usually implies a professional programming staff and a large computer center support environment.

3. Decision Support Systems (DSS) -- Systems that deal with problems of strategy that are value and future-oriented. These systems relate to the identification of alternative courses of action, changing relationships between the organization and its environment, and with potentially major shifts in the deployment of the organization's resources. DSS reports are typically oriented toward usage by key administrators for long-range impact decisions. They involve many variables which are organized in a pattern consistent with the executive's world view.

   Such systems might be used in a consortium setting when decisions are being made on the institution of new programs such as the combining of departments, the installation of an inter-campus television network, or the creation of a jointly sponsored field studies center. They might be used to determine what the differential effects would be if more money were put into three different approaches to the recruitment of minority students, so that the most effective course of action is pursued. Decision support systems could be used to assess the impact of a changing regional population base on multi-institutional recruitment of students.

   Decision support systems are not restricted to the manipulation of and perhaps the projection of historical data. They frequently draw on data that is generated by other agencies, created by "guess-timate," or are implied by the value judgments of key decision-makers. These systems address questions that are often of the ad hoc variety. Unlike the first two types of systems, decision support systems may be used to produce reports that will only be prepared once. Having once created a report, these systems can be re-used to up-date the report in the light of new information or to include new value judgments even when this makes basic redesign of the program essential.

   DSS addresses itself to decisions that typically are semi-structured. In a semi-structured decision not all of the facts are known, and opinions over what data is relevant and what relationships exist may vary dramatically. Decision support systems are part of what is known as fourth generation languages: languages which are powerful, relatively easy to learn, and capable of aiding in the construction of a problem-solving approach. Sprague (p. 87) identifies the characteristics of such systems as:

   1. Aimed at less well structured, under-specified problems of upper management.

2. Combine use of models or analytic techniques with traditional data access and retrieval functions.
3. Focus on features which make them easy to use by non-computer people in an interactive environment.
4. Emphasize flexibility and adaptability.

Bloomfield and Updegrove (p. 5) emphasize the desirability of use of DSS by executives because these individuals have control over institutional resources and a knowledge of the institution. They extend their own capabilities with DSS. With DSS they are able to test their models of reality.

B. EXAMPLES OF COMPUTER-BASED MODELS APPROPRIATE TO CONSORTIA

The following tables and graphs are illustrative of the kinds of applications consortia should be making of computers. The examples use hypothetical institutions and numbers. Although the "models" presented here would be useful as they are to some consortia, adaptation and more sophisticated extensions are more likely. Fortunately, microcomputer models are readily modified and improved. Also, these models do not exhaust the potential areas in which computer-based models would be useful. Consortium staff adequately trained in the use of DSS software can transfer the concepts underlying these samples to other application areas.

1. Projections. Table 1 is a projection of enrollments for a group of five colleges. Projections of this nature would help the institutions to test the reality of their projections if they compete for similar groups of students. Projections would benefit the consortium by providing a basis for asking questions about cooperative means for meeting the needs of new students and for stimulating a search for means of expanding the student population base.

   In addition to enrollment projections, projections of program costs and institutional budgets, and a variety of other consortium characteristics can be made. These projections would be fruitful bases for discussions by presidents vice presidents, deans and other administrative personnel who need to develop long-range plans in the context of their consortium's total resources and needs.

2. Alternative Testing. Some consortia have institutional assessments based on the member campus' ability to pay. One approach is to have a fee based on the number of students enrolled. Others have fee schedules with automatic step increases. All consortia have the option of altering the level of institutional assessment in place. Table 2 provides a projection of the incomes that might be realized if the enrollment projections of Table 1 were agreed to be accurate. Four levels of assessment are analyzed to identify the differential effects each cost per student would have on the revenue to be secured through a change in institutional assessment.

   Similar alternatives could be developed to determine possible charges for an interlibrary loan delivery system, to review the different impacts tuition charges for joint field studies courses might have, or to plan for a phased in increase of ticket prices for a jointly sponsored artist series. Bus fees or film library charges could also be effectively forecast.

PROJECTED ANNUAL ENROLLMENTS
TABLE 1

Year	PROJECTED ENROLLMENT TMC	STU	UVC	KCC	NYT	TOTAL
1984	5100	3500	3710	7500	2125	21,935
1985	5285	3500	3825	7510	2100	22,220
1986	5315	3450	3850	7485	2175	22,275
1987	5400	3425	3900	7450	2225	22,400
1988	5450	3400	3900	7400	2250	22,400
1989	5500	3400	3900	7375	2275	22,450

POSSIBLE ASSESSMENT INCOME SCENARIOS
TABLE 2

	Charge Per Student $1.00	$1.10	$1.20	$1.30
1984	$21,935	$24,129	$26,322	$28,516
1985	$22,220	$24,442	$26,664	$28,886
1986	$22,275	$24,503	$26,730	$28,958
1987	$22,400	$24,640	$26,880	$29,120
1988	$22,400	$24,640	$26,880	$29,120
1989	$22,450	$24,695	$26,940	$29,185

3. Interinstitutional Comparisons. Numerical data is essential for planning. Sometimes graphic representations are more useful, however. Table 3 is a pictorial representation generated by computer that overlays the relative pay schedules in effect at each of three colleges. Although numerical data is also accurate, graphic presentations allow for the development of insights that are often more useful to administrators. Such comparisons would help administrators to design their own compensation plans in light of the pay schedules in use at peer institutions.

   This model could easily be used to portray salaries in specific disciplines. Table 4 provides the basis for making cross institutional assessments of the relative instructional costs incurred by institutions with different and budget student mixes. Other comparisons are illustrated throughout this section.

4. Project Management. In Table 5 (parts A & B) a project calendar is based upon a manager's assumptions about how long each phase of the project will take. In the light of the time schedule computed, the manager can determine whether the schedule displayed is optimum. If it is not, changes can be made within the resources available and modify the schedule accordingly. This time schedule also provides control points for evaluation. This model (adapted from one in 1-2-3 for Business) also computes the costs for mounting an effort to develop a design for a computer software database, to assemble this data base, and finally to publish and distribute a printed report.

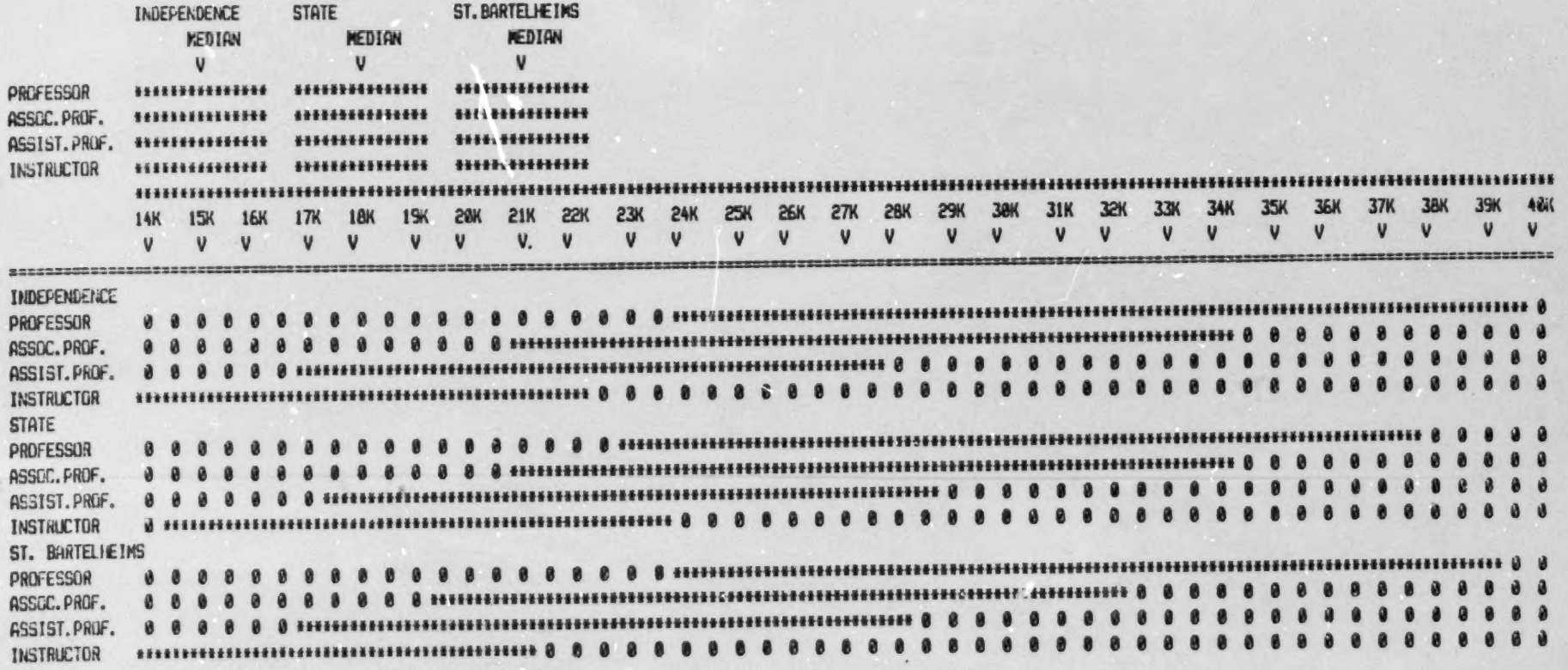
5. Interdepartmental Comparisons. Frequently consortia are involved in the development of projects and programs specific to a given discipline. This may require assembling and analyzing departmental data characterizing those departments. Table 6 provides summary data on salient aspects of English departments in five institutions. This data can be reviewed and presented in many ways.

   Graph 1 and 3 provide rapid assessments of the relative size of each department with respect to the number of credit hours generated by, and the number of graduates from, each department. Table 3 compares the number of faculty at each campus.

   A retrospective look at the number of courses offered by the physics departments at these institutions is provided in Table 7. This data could be used to develop assumptions about future course offerings and to develop projections based on the assumptions and on the historical data. Graphic presentations similar to those given for the English departments might be effective needs of conveying the same information. (See Graph 6)

6. Data Base Development. Cross registration is one of the most common cooperative programs managed by consortia. Computers can be used to provide fast information storage, retrieval and analysis. With a data base program a consortium director could prepare a data base of information about cross registrants and subsequently sort the data to produce a list of cross registrants moving out of each college (Table 8), re-sort the data to produce a list of cross registrants coming into each campus (Table 9), and sort the list again to order the courses by field to determine which fields are most popular (Table 10).

CHART OF COMPARATIVE SALARIES BY INSTITUTION
TABLE 3



COMPARATIVE INSTITUTIONAL COST OF INSTRUCTION PER CREDIT & F.T.E.

TABLE 4

	INSTITUTION		
	VTI	HCU	BC
TOTAL ANNUAL S. CR. HRS	3,232	56,951	15,076
TOTAL ANNUAL F.T.E.	246.6	3,920.9	1,063.3
TOTAL ANNUAL FAC	16.00	193.00	35.42
OPERATING $	$75,722	$444,869	$55,875
PERSONAL SERVICE	$1,707,882	$7,726,356	$14,844,781
TOTAL OP. BUDGET	$783,604	$8,171,225	$1,540,656
OPER. $ /S. CR. HR.	$23	$8	$4
OPER. $ /F.T.E	$307	$113	$53
OPER. $ /F.T.E. FAC.	$4,733	$2,296	$1,577
PERSONAL SRV. / S. CR. HR.	$219	$136	$98
PERSONAL SRV. /F.T.E.	$2,871	$1,971	$1,396
TOTAL COST /S. CR. HR.	$242	$143	$102
TOTAL COST / F.T.E	$3,178	$2,084	$1,449

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PROJECT TIME LINE TABLE 5 - PART A

JOB DESCRIPTION

Job: JOINT COMPUTER SOFTWARE CATALOGING PROJECT
Manager: Dr. I. M. Nuts

Begins: 01-Mar
Ends: 25-Apr
Duration: 55 Days
Today's Date:

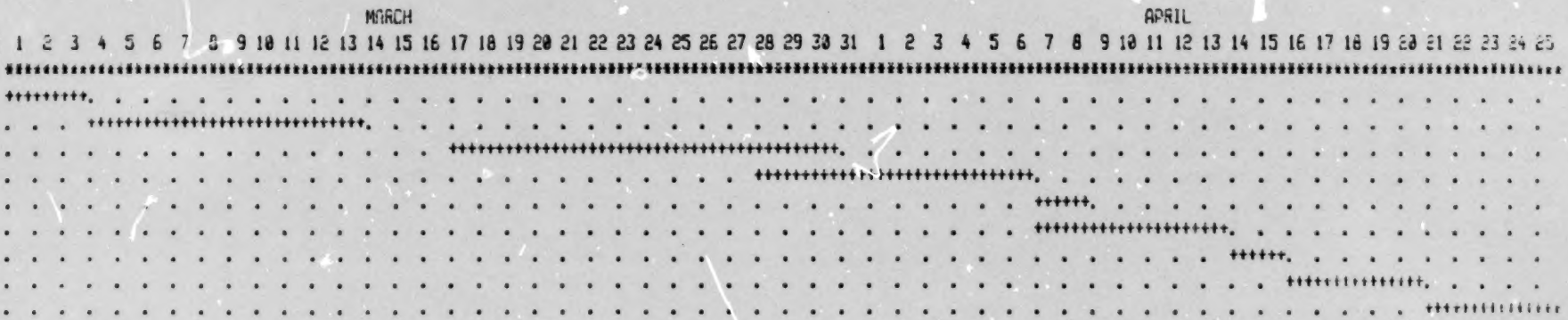
Task	Task Description	Task Duration	Employee Category	Daily Rate	Number	Payroll Cost	Other Direct Cost	Total Direct Cost	Earliest Possible Start		Precedent Tasks		Task Begins	Task Ends
1	Prepare Specifications	3 Days	1	$88	1	$265	$50	$315	01-Mar	0			01-Mar	03-Mar
2	Write & Test Code	10 Days	2	$69	1	$692	$150	$842			1		04-Mar	13-Mar
3	Gather Data on Software	14 Days	0	$0	5	$0	$250	$250	17-Mar		1	2	17-Mar	30-Mar
4	Data Entry	10 Days	3	$48	2	$962	$35	$997	28-Mar		1	2	28-Mar	06-Apr
5	Receive First Report	2 Days	0	$0	5	$0	$0	$0			4		07-Apr	08-Apr
6	Revise & Correct	7 Days	0	$0	5	$0	$0	$0			4		07-Apr	13-Apr
7	Produce Final Copy	2 Days	0	$0	5	$0	$35	$35			6		14-Apr	15-Apr
8	Send Copy To Printer	5 Days	0	$0	5	$0	$575	$575			7		16-Apr	20-Apr
9	Release & Distribute	5 Days	0	$0	1	$0	$200	$200			8		21-Apr	25-Apr
99														25-Apr
Totals:						$1,919	$1,295	$3,214						

EMPLOYEE DATA

Employee Category	Description	Annual Salary	$/Day
0	No Paid Manpower Required	$0	$0
1	Systems Analyst	$23,000	$88
2	dBASE II Programmer	$18,000	$69
3	Data Entry Clerk	$12,500	$48

PROJECT TIME LINE TABLE 5 - PART B

GANTT CHART



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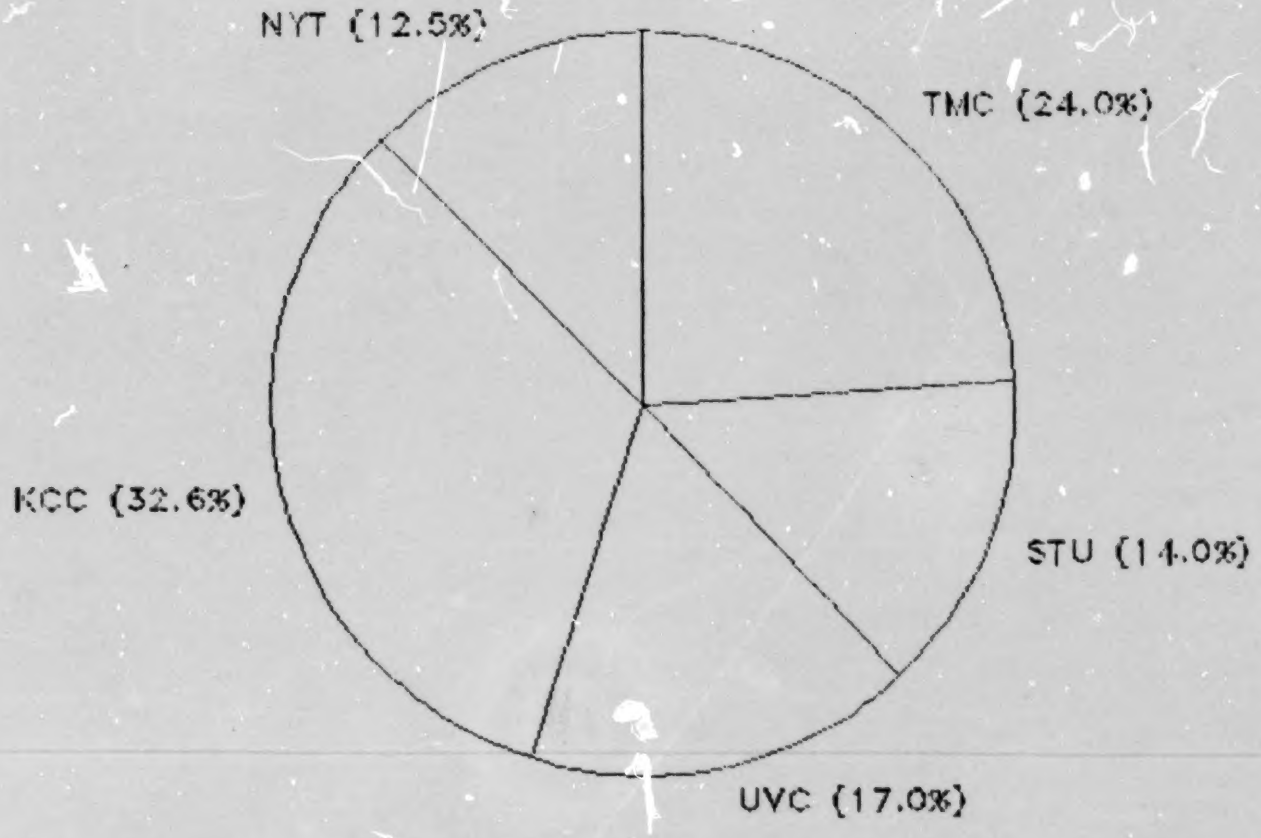
COMBINED ENGLISH DEPARTMENTAL DATA
TABLE 6

UNDERGRADUATE ONLY

	TMC	STU	UVC	KCC	NYT
NO. OF PROFESSORS	2	2	3	4	1
NO. OF ASSOC. PROF.	7	1	2	6	3
NO. OF ASSIST. PROF.	10	4	2	9	2
NO. OF INSTRUCTORS	0	2	3	3	0
NO. OF GRAD. ASSIST	1.25	0	2	3	0
OTHER	1.5	0.6	0.5	1.5	1
NO. OF FTE	21.75	9.6	12.5	26.5	7
NO. OF SECTIONS	65	40	42	87	31
NO. OF CR. HRS./SEM	6000	3500	4255	8150	3120
NO. OF GRADUATES	120	10	105	155	15
CR. HRS./FAC.	275.86	364.58	340.40	307.55	445.71
DEPT. BUDGET/YR	$375,000	$150,000	$210,000	$438,000	$110,000
COST/CR. HR.	$63	$43	$49	$54	$35

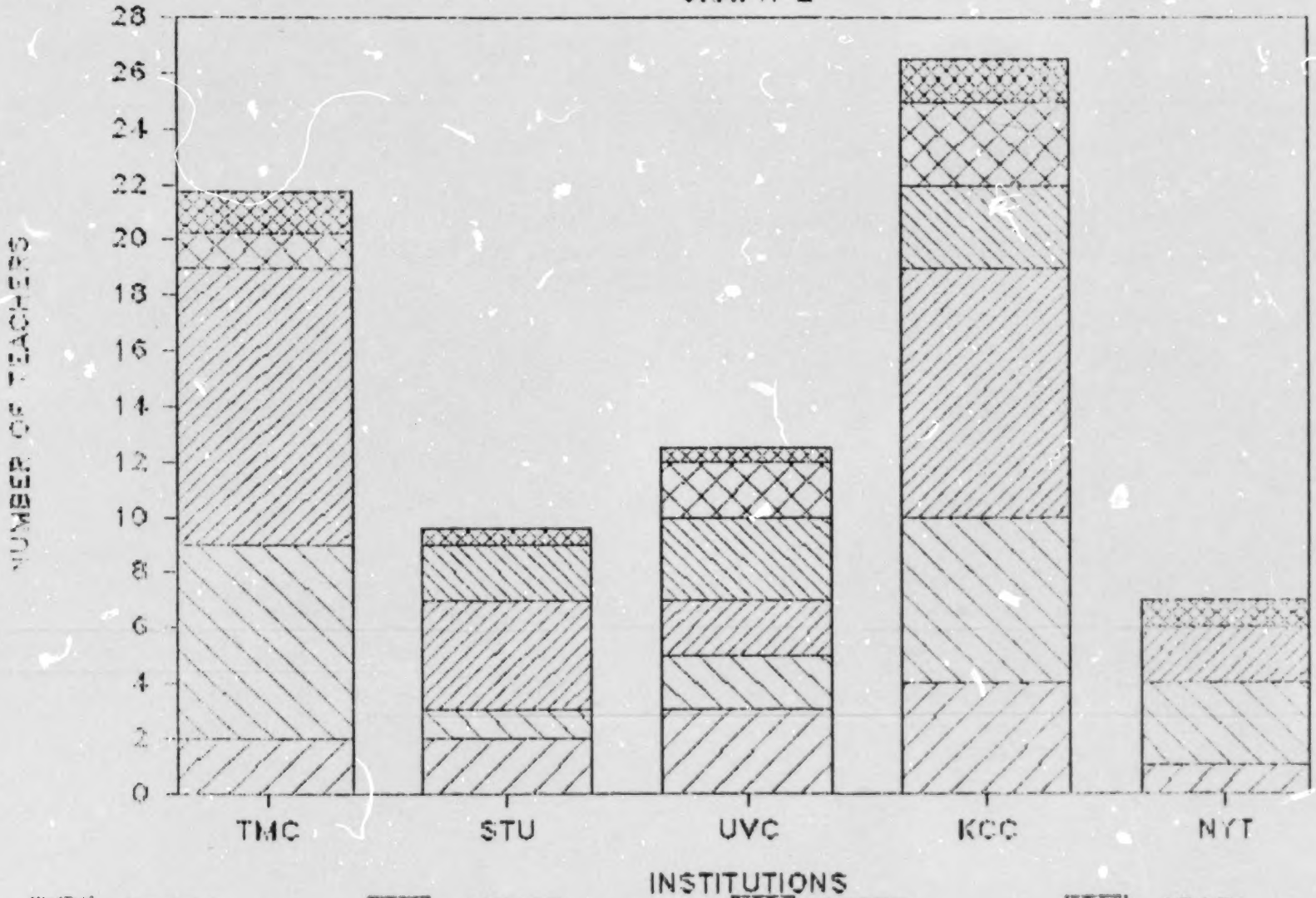
ENGLISH DEPT. CREDIT HOURS GENERATED

GRAPH 1



ENGLISH DEPARTMENT STAFFING

GRAPH 2



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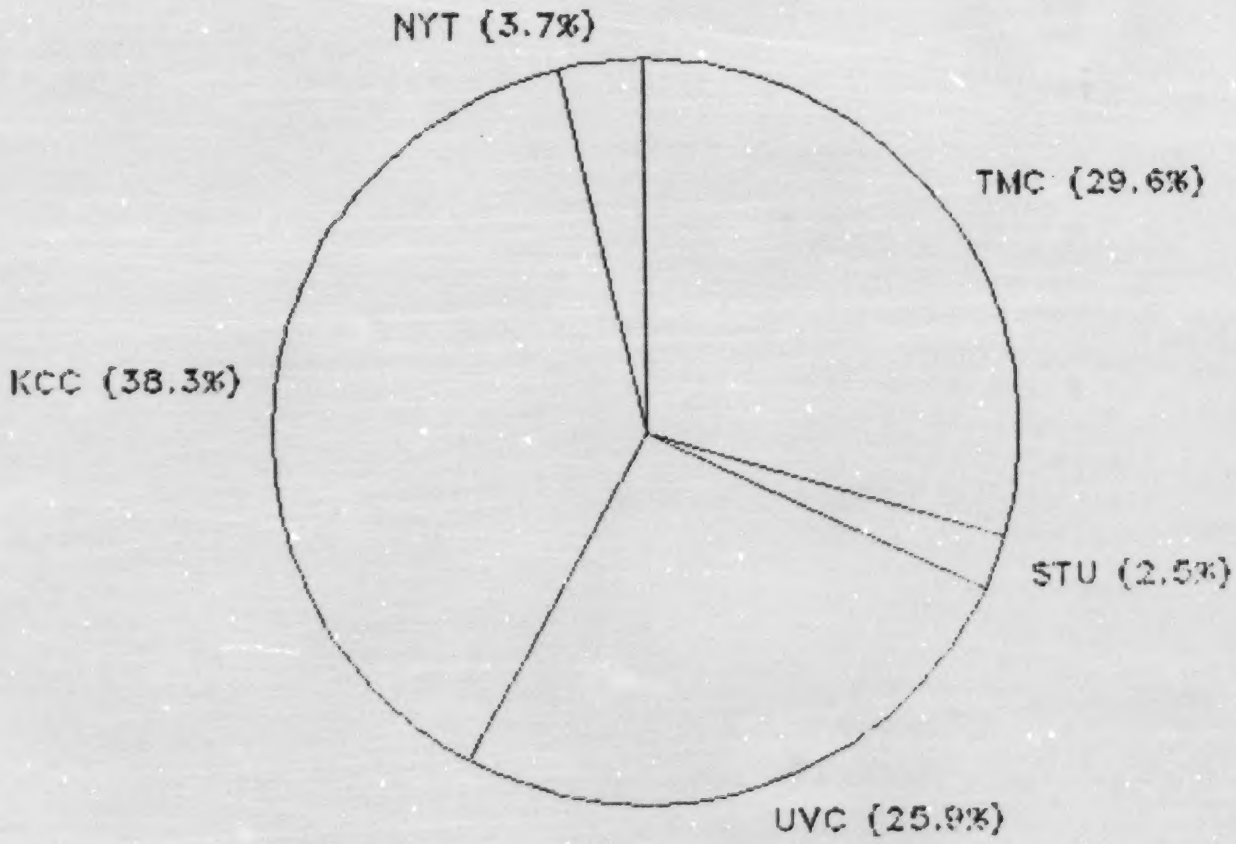
NUMBER OF 1984 ENGLISH DEPT. GRADUATES

GRAPH 3



COURSE TRENDS IN PHYSICS
TABLE 7

	TMC	SYU	UVC	KCC	NYT	TOTALS
F,1981	66	37	45	90	15	253
S,1982	63	35	47	81	17	243
F,1982	55	45	44	82	21	247
S,1983	59	43	41	82	25	250
F,1983	67	41	48	80	27	263
S,1984	65	40	49	77	31	262

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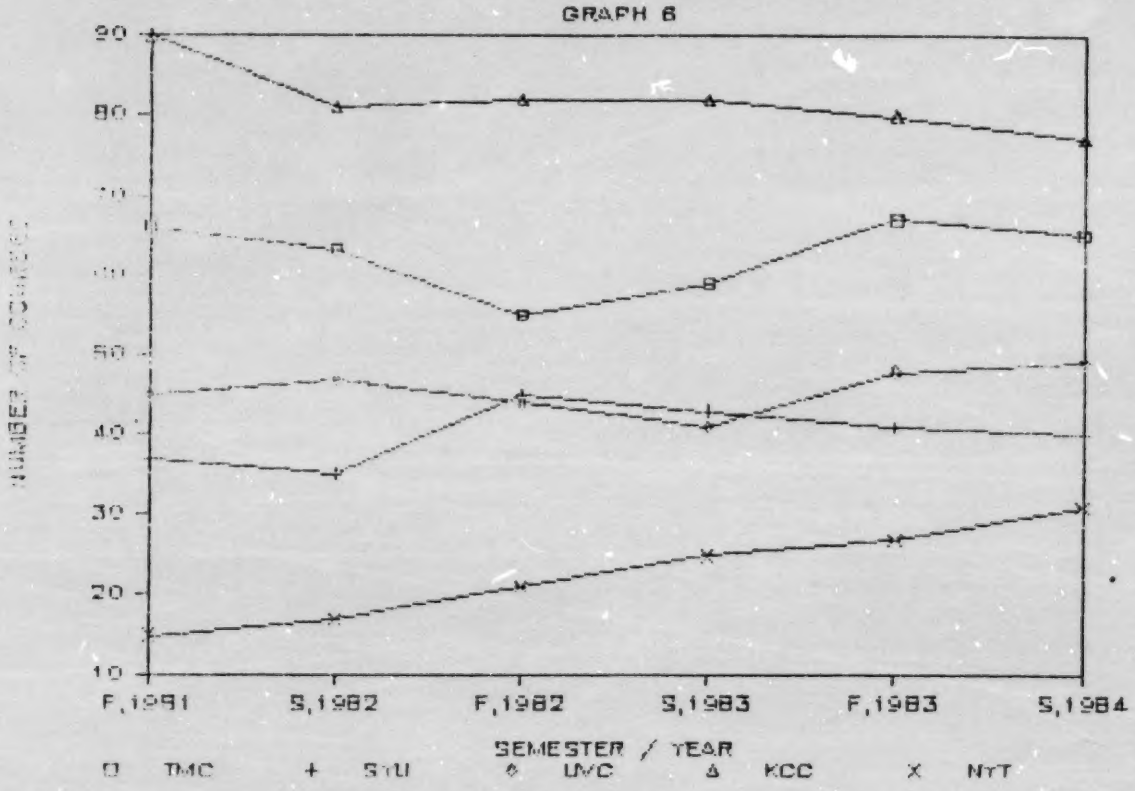
PHYSICS DEPARTMENT COURSE OFFERINGS



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CROSS REGISTRATION DATA BASE
TABLE 8

COLLEGE # 1 = TTI
COLLEGE # 2 = CMC
COLLEGE # 3 = CCI
COLLEGE # 4 = WMU

COLLEGE FROM	COLLEGE TO	NAME LAST	NAME FIRST	ID #	COURSE #	COURSE NAME	SEC. #	CREDIT HOURS	STATUS
1	3	ANKMON	ALLEN	876875432	CJ120	CRIMINAL JUSTICE	5	4	3
1	3	CHARLES	DARNELL	356532100	ART689	ARTHISTORY	3	1	2
1	3	CHARLES	DARNELL	356532100	FCM461	FAMILY & COMMUN. MED	4	2	2
1	2	CORROTHERS	TIMOTHY	191837456	ART689	ART HISTORY	2	3	2
1	3	GALLOWAY	PAT	867488797	ENV294	ENVIRONMENT	6	4	3
1	2	GLOVER	TONY	359446000	GEO103	GEOLOGY	1	4	1
1	2	GLOVER	TONY	359446000	ART689	ART HISTORY	1	1	1
1	3	JACOBS	JOANN	879098765	BIO286	MICROBIOLOGY	3	3	3
1	3	JONES	MICHELLE	878665433	ENV294	ENVIRONMENT	2	6	1
1	2	O'MERA	BOBBY	768576869	ENV294	ENVIRONMENT	6	4	2
1	3	SIMS	STEPHEN	654324343	ART689	ART HISTORY	1	5	1
1	2	WILCOX	MARY	354675421	ART689	ART HISTORY	4	2	1
2	3	COBBS	RICKY	768547683	ENV294	ENVIRONMENT	3	3	1
2	1	DREW	NANCY	564768797	CJ120	CRIMINAL JUSTICE	3	1	2
2	1	FRENCH	TRENTON	354654323	ART689	ART HISTORY	1	6	2
2	3	HARDMAN	PHILLIP	998765444	GEO103	GEOGRAPHY	5	2	3
2	1	PATTERSON	JOHN	357563535	ENV294	ENVIRONMENT	5	4	2
2	1	ROBERTS	AARON	768453546	CJ120	CRIMINAL JUSTICE	2	4	2
2	1	WELLS	DENNIS	453775623	BIO286	MICROBIOLOGY	4	6	2
2	1	WILLIAMS	JANIS	789654343	ART689	ART HISTORY	2	5	2
3	1	DAVIS	EARNIE	359448700	ENV294	ENVIRONMENT	3	6	2
3	1	DAVIS	EARNIE	359448700	FCM461	FAMILY & COMMUN. MED	6	6	1

CROSS REGISTRATION DATA BASE
TABLE 9

COLLEGE # 1 = TTI
COLLEGE # 2 = CMC
COLLEGE # 3 = CCI
COLLEGE # 4 = WMU

COLLEGE FROM	COLLEGE TO	NAME LAST	NAME FIRST	ID #	COURSE #	COURSE NAME	SEC. #	CREDIT HOURS	STATUS
3	1	DAVIS	ERNIE	359448700	FCM461	FAMILY & COMMUN. MED	6	6	1
3	1	DAVIS	ERNIE	359448700	ENV294	ENVIRONMENT	3	6	2
3	1	DILLWORTH	SANDRA	978654363	GEO103	GEOLOGY	6	5	1
3	1	DILLWORTH	SANDRA	987654363	ATR689	ARTHISTORY	5	6	1
2	1	DREW	NANCY	564768797	CJ120	CRIMINAL JUSTICE	3	1	2
2	1	FRENCH	TRENTON	354654323	ART689	ART HISTORY	1	6	2
3	1	GRAVES	JEANIE	569098765	CJ120	CRIMINAL JUSTICE	4	3	2
3	1	JOHNSON	VERNON	498765421	BIO286	MICROBIOLOGY	3	5	3
2	1	PATTERSON	JOHN	357563535	ENV294	ENVIRONMENT	5	4	2
2	1	ROBERTS	AARON	768453546	CJ120	CRIMINAL JUSTICE	2	4	2
2	1	WELLS	DENNIS	453775623	BIO286	MICROBIOLOGY	4	6	2
2	1	WILLIAMS	JANIS	789654343	ART689	ART HISTORY	2	5	2
1	2	CORROTHERS	TIMOTHY	191837456	ART689	ART HISTORY	2	3	2
3	2	FREEMAN	DEBRA	768765432	ENV294	ENVIRONMENT	3	4	3
1	2	GLOVER	TONY	359446000	ART689	ART HISTORY	1	1	1
1	2	GLOVER	TONY	359446000	GEO103	GEOLOGY	1	4	1
3	2	HOLLAND	HERBERT	632199500	ART689	ART HISTORY	6	4	3
3	2	HOLLAND	HERBERT	632199500	GEO103	GEOLOGY	6	4	2
3	2	MCDOWN	MARY	789685877	CJ120	CRIMINAL JUSTICE	1	2	3
3	2	MERRICK	FREDA	789654536	CJ120	CRIMINAL JUSTICE	6	4	3
1	2	O'MERA	BOBBY	768576869	ENV294	ENVIRONMENT	6	4	2
3	2	PENTERGRAPH	STEPHANIE	546474849	GEO103	GEOLOGY	6	2	2

CROSS REGISTRATION DATA BASE
TABLE 10

COLLEGE # 1 = TTI
COLLEGE # 2 = CMC
COLLEGE # 3 = CCI
COLLEGE # 4 = WMU

COLLEGE FROM	COLLEGE TO	NAME LAST	NAME FIRST	ID #	COURSE #	COURSE NAME	SEC. #	CREDIT HOURS	STATUS
3	2	PORTER	SHANNON	323675533	ART680	METAL WORKING	1	3	2
2	1	FRENCH	TRENTON	354654323	ART689	ART HISTORY	1	6	2
2	1	WILLIAMS	JANIS	789654343	ART689	ART HISTORY	2	5	2
3	2	HOLLAND	HERBERT	632199500	ART689	ART HISTORY	6	4	3
1	2	WILCOX	MARY	354675421	ART689	ART HISTORY	4	2	1
1	2	GLOVER	TONY	359446000	ART689	ART HISTORY	1	1	1
3	2	PHILIPS	THOMAS	909564343	ART689	ART HISTORY	4	6	2
1	2	CORROTHERS	TIMOTHY	191837456	ART689	ART HISTORY	2	3	2
1	3	CHARLES	DARNELL	356532100	ART689	ART HISTORY	3	1	2
1	3	SIMS	STEPHEN	6543[illegible]4343	ART689	ART HISTORY	1	5	1
3	1	DILLWORTH	SANDRA	987654363	ATR689	ARTHISTORY	5	6	1
2	1	WELLS	DENNIS	453775623	BIO286	MICROBIOLOGY	4	6	2
3	1	JOHNSON	VERNON	498765421	BIO286	MICROBIOLOGY	3	5	3
1	3	JACOBS	JOANN	879098765	BIO286	MICROBIOLOGY	3	3	3
2	1	DREW	NANCY	564768797	CJ120	CRIMINAL JUSTICE	3	1	2
2	1	ROBERTS	AARON	768453546	CJ120	CRIMINAL JUSTICE	2	4	2
3	1	GRAVES	JEANIE	569098765	CJ120	CRIMINAL JUSTICE	4	3	2
3	2	MCDOWN	MARY	789685877	CJ120	CRIMINAL JUSTICE	1	2	3
3	2	MERRICK	FREDA	789654536	CJ120	CRIMINAL JUSTICE	6	4	3
1	3	ANKMON	ALLEN	876875432	CJ120	CRIMINAL JUSTICE	6	4	3
3	1	DAVIS	ERNIE	359448700	ENV294	ENVIRONMENT	3	6	2
2	1	PATTERSON	JOHN	357563535	ENV294	ENVIRONMENT	5	4	2

Other analyses could be made to prepare matrices reflecting how many students, courses and credits are being provided by or received by each campus.

Other data bases that could be developed are faculty interest inventories, equipment inventories, multi-department telephone directories, listings of rolling stock, and special facilities.

7. Budgeting. Consortia are heavily involved in the development of new projects and programs. This process is often made cumbersome because of the difficulty of calculating and re-calculating budgets. Table 11 represents the first step in the development of a budget for the project described below in section IV. It identifies all of the factors which go into the costing out of a project. It also allows for the attachment of specific costs for each factor.

   Table 12 is one budget derived from these assumptions. The amounts of money appearing in each column are created through the use of formulas which use the assumptions given. For example, participant per diems are calculated by a formula which says "multiply the number of participants (12) by the number of training days (7) and by the per diem ($75)."

8. Graphic Representations. Table 13 offers the interlibrary loan statistics for four colleges over a year. Graph 4 provides an improved basis for understanding the meaning of the numbers stated. Similarly, the numbers that provide the bases for Graph 5 are less dramatic than the graph which clearly indicates the high and low points for ridership, as well as the daily flow of riders on this system. Graph 6 compares the relative numbers of courses offered by five departments.

   The foregoing examples were constructed to illustrate the variety of uses EDP, MIS and DSS software can be put to. The examples do not exhaust the possibilities.

C. OBSTACLES TO COMPUTER USAGE

If computers can be so useful, why are they not being employed more extensively than the survey indicated? Consortia are not unique in the slowness with which they have made use of computers. Neither has their reluctance been irrational. Many reasons which are beginning to disappear made their reluctance understandable. Among the obstacles consortium staff saw were:

1. The total cost of acquiring computers, terminals, printers, software development assistance and computer training was prohibitive in light of the institution's budget.

2. The software development cycle was too time consuming and complex for anything other than the most important of projects. The use of third generation languages requires 6 months to 1 year development cycles that are rarely justifiable in consortium time frames and budgets.

3. Third generation languages did not lend themselves to the shaping of solutions to decisions which were often ad hoc in nature and presented in too short a time frame to allow for adequate software development.

CONSORTIUM TRAINING BUDGET
TABLE 11

NO. OF PARTICIPANTS	12
NO. OF TRAINING DAYS	7
DIRECTOR PER DAY	$400.00
DIRECTOR DAYS	14
PER DIEM	$75.00
AVERAGE AIR FARE	$400.00
DIRECTOR TRAVEL	$600.00
NO. OF CONSULTANTS	3
COST PER CONSULTANT	$400.00
MAINFRAME PER HR.	$50.00
MAINFR. TIME PER PARTIC.	5
LOTUS SOFTWARE	$325.00
MICROCOMPUTER	$2,500
PRINTER	$750.00

OTHER SOFTWARE	$500.00
ANNUAL MAINTENANCE	$350.00
BOOKS	$50.00
TELE. PER PARTIC.	$15.00
REPRO. PER PARTIC.	$15.00
SECRETARIAL DAYS	7
SECRETARIAL PER DAY	$100.00
STUDENT ASSIST. DAYS	7
STUDENT PER DAY	$75.00
PARTIC. TIME COST	$250.00
SUPPLIES PER PARTIC.	$150.00
FURNITURE COST	$350.00
ACCOUNTING COST	0.05

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COMPUTER PROJECT BUDGET
TABLE 12

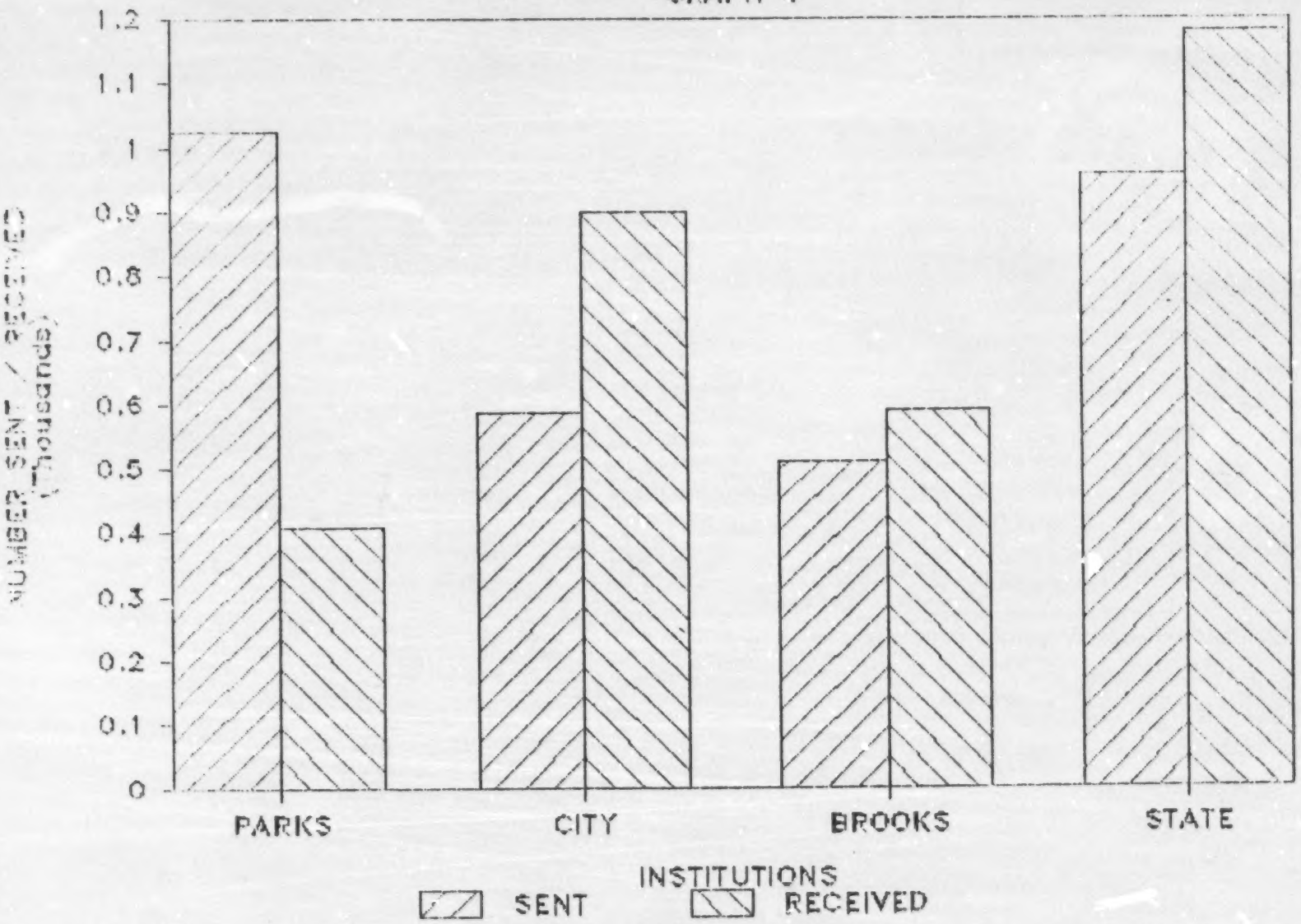
	1984-1985		1985-1986		TOTALS	
STAFF	FOUNDATION	MATCHING	FOUNDATION	MATCHING	FOUNDATION	MATCHING
PROJECT DIRECTOR	$5,600	$0	$5,600	$0	$11,200	$0
SECRETARY	1,200	0	1,200	0	2,400	0
CONSORTIUM STAFF	0	21,000	0	21,000	0	42,000
STUDENT ASSISTANTS	525	0	525	0	1,050	0
FRINGE BENEFITS	1,465	4,200	1,465	4,200	2,930	8,400
TRAVEL AND PER DIEM						
PARTICIPANT PER DIEM	6,300	0	6,300	0	12,600	0
PARTICIPANT TRAVEL	4,800	0	4,800	0	9,600	0
DIRECTOR PER DIEM	525	0	525	0	1,050	0
DIRECTOR TRAVEL	600	0	600	0	1,200	0
CONSULTANT	1,200	0	1,200	0	2,400	0
COMPUTER COSTS						
MICROCOMPUTER	19,980	9,990	19,980	9,990	39,960	19,980
PRINTER	9,000	0	9,000	0	18,000	0
LOTUS SOFTWARE	3,900	0	3,900	0	7,800	0
OTHER SOFTWARE	3,600	3,600	3,600	3,600	7,200	7,200
ONE YEAR MAINTENANCE	2,100	2,100	2,100	2,100	4,200	4,200
VAX TIME	3,000	0	3,000	0	6,000	0
OTHER						
CONSULTANTS	1,200	0	1,200	0	2,400	0
SUPPLIES	1,199	599	1,199	599	2,398	1,199
FURNITURE	2,100	2,100	2,100	2,100	4,200	4,200
BOOKS	600	0	600	0	1,200	0
REPRODUCTION	180	0	180	0	360	0
TELEPHONE	180	0	180	0	360	0
ACCOUNTING	3,463	2,179	3,463	2,179	6,925	4,358
TOTALS	$72,716	$45,769	$72,716	$45,769	$145,433	$91,538

INTER-LIBRARY LOAN STATISTICS
TABLE 13

	PARKS	CITY	BROOKS	STATE	TOTALS
SENT	1024	587	512	957	3080
RECEIVED	408	899	590	1183	3080

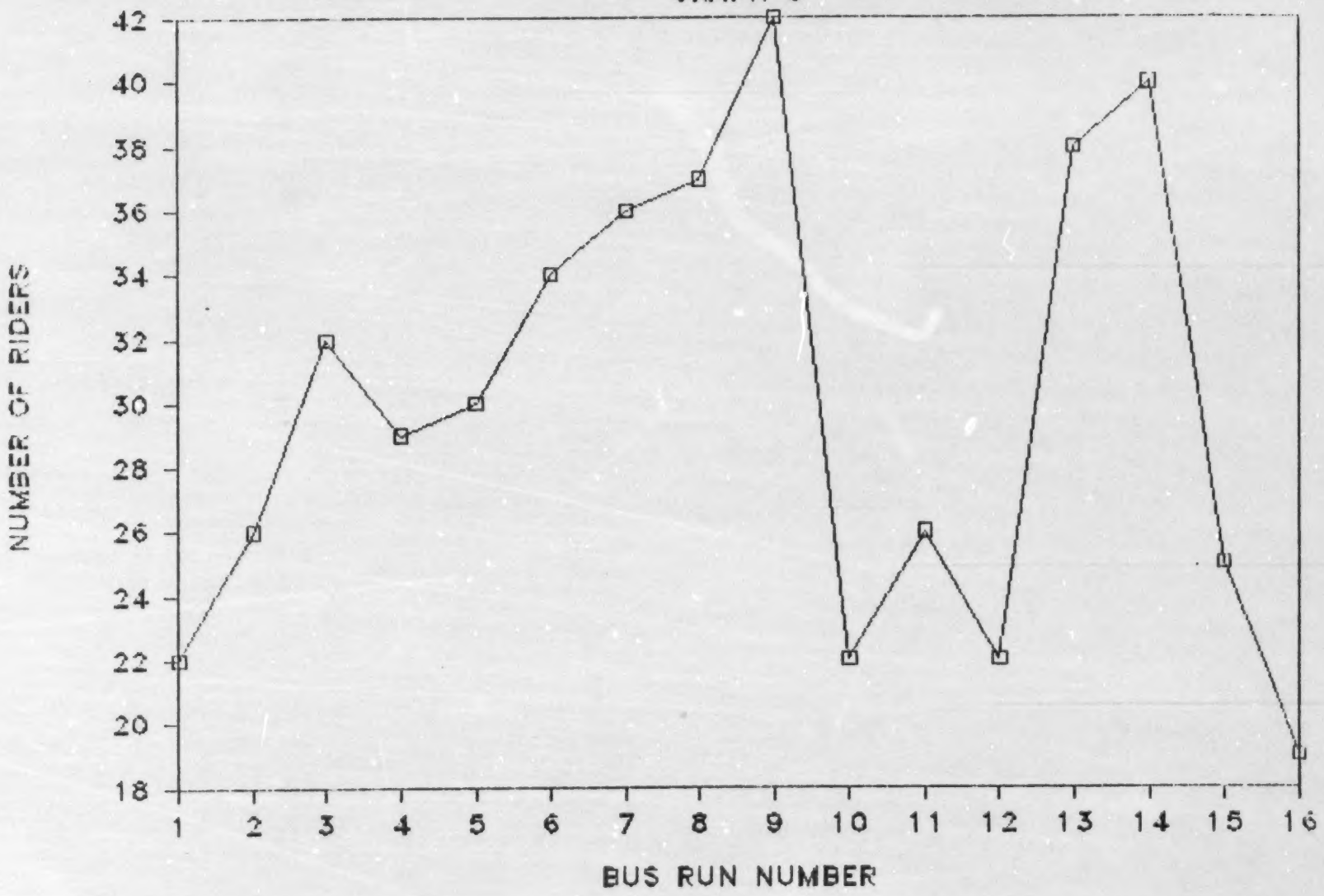
INTER-LIBRARY LOAN STATISTICS

GRAPH 4



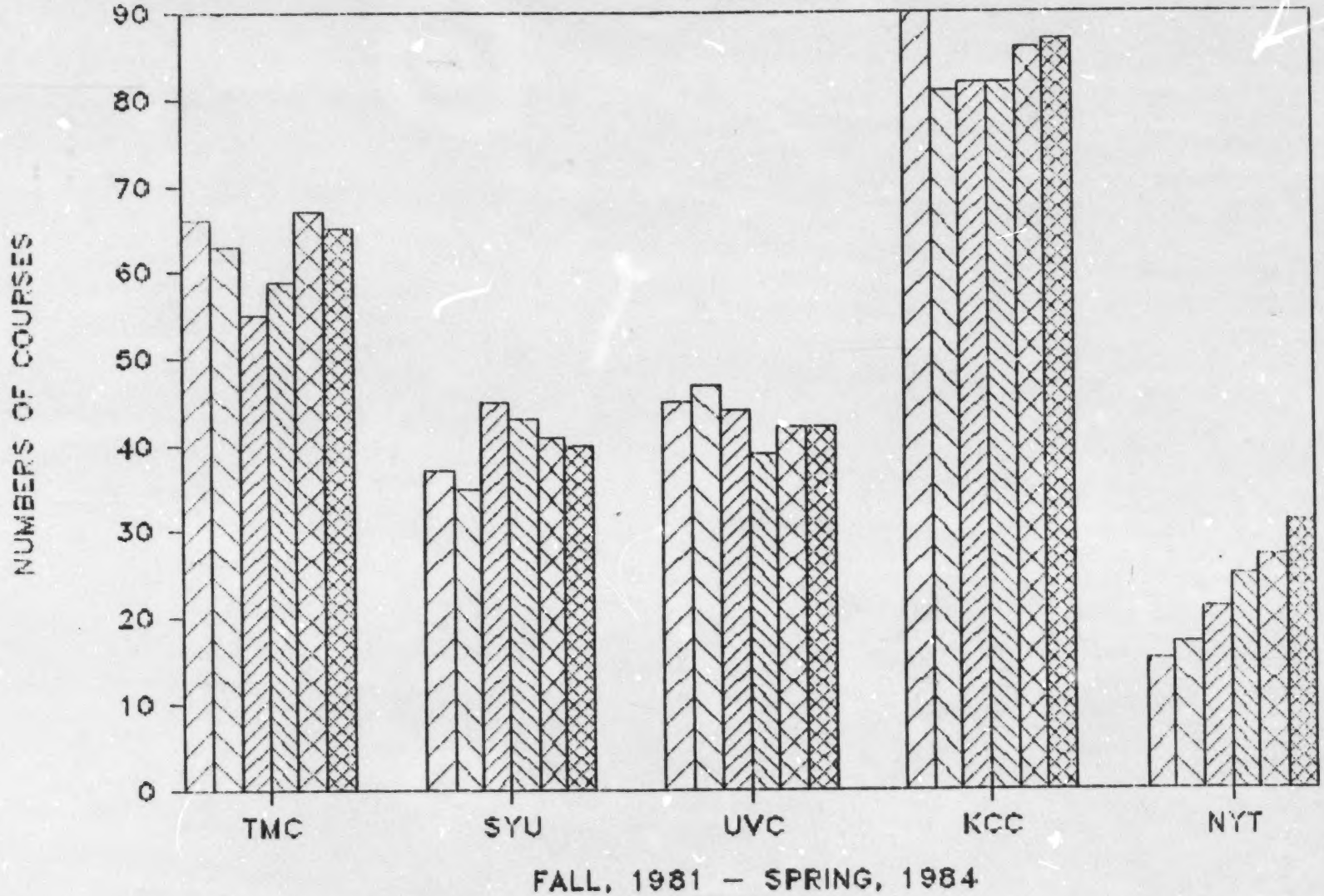
MAY BUS RUN AVERAGES

GRAPH 5



SIX SEMESTERS OF PHYSICS COURSES

GRAPH 6



4. Consortium staff have little training in computer usage. Their reliance on professional programmers, often unpaid volunteers, guaranteed that they would limit their requests to essential data gathering and data processing tasks. Consortium staff perceptions of the utility of computers has only recently changed from that described by Keene (Educom, p. 18):

> "Managers are used to doing planning and analysis manually. They associate DP with transaction processing and standardized reports and see it as a distant unresponsive unit."

D. FOURTH GENERATION TOOLS

The emergence of microcomputers as devices capable of handling sophisticated applications is the primary factor in reducing the impact of the obstacles cited. Alone the microcomputer would scarcely have changed the situation very much. However, the availability of "user-friendly," yet powerful microsoftware packages has made the potential for change very bright. At least the following types of software are sufficiently inexpensive and still rich enough to meet most consortium management needs.

1. Spreadsheets. Tables of the type provided above in part II.B. illustrate the spreadsheet concept. Row-by-column matrices which contain quantitative data can be used in complex arrangements to calculate sums, totals and other, more intricate mathematical results. Monetary spreadsheets are common, but other quantitatively described phenomena are equally-well dealt with in spreadsheet packages such as MultiPlan, VisiCalc and SuperCalc.

2. Financial Modelling Software. Break-even cost analyses, calculation of present net value, and other financial operations are accommodated by modelling systems such as DSS: Financial from Addison Wesley and the Interactive Financial Planning System from Execucom.

3. Word Processing. Document preparation is facilitated immensely by the availability of word processors or computers using word processing software. This document, for instance, was largely produced by a DECmate word processor. Microcomputer word processing software includes the Word Perfect, Word Star, Benchmark and Multimate packages.

4. Data Base Systems. dBASE II and III, Condor I and III, and Rbase: 4000 are examples of data base systems that provide excellent report writing capabilities. Drawing on records about events, individuals and other entities, data base software is of great use in retrieving individual records or groups of records with stated characteristics.

5. Graphics. In order to produce high quality presentation graphics, packages such as Execuvision, PC-Draw and PC-Crayon can be used to design graphic arts slides and transparencies. Other packages offer business and statistical graphing capabilities. More complex packages and hardware allow for the digitizing of existing images.

6. Communications. Communications between microcomputers and mainframe computers is increasingly common. Crosstalk XVI, ASCII Express and other

packages enable managers to upload and download files, to use mainframe software, and to use electronic mail.

7. Integrated Software Packages. Lotus 1-2-3, Symphony, Context MBA and Framework are integrated software packages. These software packages include multiple functions. Lotus, the package used to create the tables and graphs for this document, allow the user to draw upon data base, spreadsheet and graphics capabilities. Its successor, Symphony, adds word processing and communications abilities. Thus, with one package the user can engage in a variety of activities.

8. Statistical Packages. The Statistical Package for the Social Sciences (SPSS), the Biomedical Data Package (BMD) and Minitab are among the more sophisticated statistical packages that could be used for information analysis.

E. THE NEED FOR CONSORTIA TO MAKE USE OF DECISION SUPPORT AND OTHER COMPUTER SOFTWARE

Consortia should benefit significantly by making greater substantive use of computers. They should realize many of the same benefits that have been, and are being, realized by campus and industrial organizations. The kinds of benefits most often cited are:

1. To understand the organization better. Consortium undertakings are, not infrequently, begun and/or stopped with minimal data. The use of modelling techniques encourages more knowledgeable decision making. Attendant to this is the growth in sophistication decision makers experience as they add variables, quantify values, identify new relationships among variables and discuss their perceptions among themselves in the face of a quantifiable model.

2. To increase the number of available choices. People have limited capabilities for proposing and evaluating possible solutions to a particular problem. Computer models can expand the number of choices available and can integrate the complex interactions of multiple variables under each set of conditions.

3. To improve the ability of the consortium to obtain, handle and manipulate data. The development of decision-oriented models is the first step in improved decision making. Following this step the decision makers will refine and improve their understanding of the problems they deal with. Subsequently, new data collection techniques will be employed, additional data will be secured and new interrelationships will be discovered; and all of these will be integrated into a more realistic, useful model.

4. To improve organizational communications. The presence of valid models of various kinds helps people to be informed about the nature of their enterprise. Whether they be presidents or middle managers, deans or faculty members, the availability of explicit models provides an important medium for communication. Modification or adoption of a model requires group acceptance of the relationships implied and of the outcomes being sought.

IV. CONCLUSIONS

1. When compared with the level of computer-based data and modelling systems usage made by other administrators in higher education, consortium staff and consortium boards of directors have considerably less support.

   There are, no doubt, many reasons for this. Institutions of all types have tended to obtain computers first to handle basic data processing functions such as accounts receivable, enrollment counting, transcript preparation, etc. A threshold level of such basic needs pushes campuses into the electronic age. Only after an institution's perception of how this data can be better used has matured do more analytic questions arise as a consequence of the availability of data. New modelling techniques, revised integrated management information systems are implemented to secure decision-oriented data when this maturity occurs.

   Consortia do not typically have the massive operational data bases that give rise to electronic data processing centers. Rather, they rely on institutional data when it is available, and unfortunately, in the form it happens to be in. Incomparable data definitions and other factors frequently make data difficult to use for interinstitutional policy analyses. Consortium needs have been hidden by the previous reliance on mainframe computers that Keene (Educom, p. 17) refers to as a monopoly that obscured latent demand.

   Further, it is ony recently that microcomputer equipment and software has begun to show its promise of being suitable and affordable for organizations that were economically locked out of the mainframe data center.

2. Interest is high in applying the computer to the solution of consortium problems.

   Those few consortia that are already active in the use of computers cite their enthusiasm for doing more with this technology, and those whose budgets have prevented them from acquiring appropriate computer equipment appear to be confident that the electronic technologies have an important role to play. To a large extent, this enthusiasm is not based on a detailed knowledge of precisely how such systems can address their needs. Instead consortium directors appear to be aware of the advances being made on the campuses and in industry and their intuition suggests an equally valuable promise of progress in their own functional areas.

3. Computer-usage in consortia is generally restricted to word processing, record keeping and operational data tracking functions.

   The generation of ledgers, word processing activities and the listing of statistical characteristics of member institutions typify the most common uses of computers. This observation is not to be critical of these organizations since such activities do increase the consortium's efficiency. Indeed, it is the exposure of consortia to these activities which enhances their ability to take on uses which can improve their effectiveness also.

4. The least common uses of computers in consortial settings are policy and decision-oriented.

Few consortia have the hardware, software and personnel to employ computers for institutional research and policy development. Decision support systems are rarely available, much less used, even though consortium staff indicated a desire to use these capabilities more intensively.

5. Consortium staff have the potential for learning to use microcomputer-based software for improved consortium policy development.

Many of the most effective "best sellers" in the microcomputer software market can be rapidly learned if an individual already has had some experience with such things as computer terminology, the concept of files, programs and data records, the differences between programs and data; editing and running a program. The exposure of consortium staff to word processing and other systems and their limited but valuable prior training should make their learning curves more rapid in acquiring new skills than would be true of a totally computer illiterate group.

6. An opportunity exists for consortia to help one another in the development and sharing of generic models and data handling techniques.

Although each consortium is obviously unique in the nature of its institutional mix, in the array of programs it sponsors and in the personalities involved, still most consortia have problems and functions that are found in many of their numbers. They may, for example, operate cross registration programs, sponsor off-campus study centers, develop inventories of equipment, cost out new programs, attempt to describe institutional resources, develop cost benefit ratios in justifying added projects, or analyze questionnaires to faculty. "Manual" techniques are inadequate, slow or both. It is reasonable to expect that an inter-consortium sharing of computer-based models is feasible. Many of the problems of consortia can be addressed from a common perspective even though efforts to accommodate individual differences is required.

In order to make or initiate an inter-consortium sharing mechanism, it should be understood that the usage of computers will become a responsibility of existing staff, not of added, professionally-trained programmers. Programmers may help ocassionally with advice. Few consortia in the near term can afford to hire this type of staff member.

It is also clear that consortia will not be able to make use of the most advanced, mainframe-oriented decision support systems. This is partially due to the absence of trained staff and to the expense of such systems. It is more the result of such systems' reliance on the existence of extensive operational-level data bases which can be manipulated in various ways. The ability of any computer to assemble data from among all member institutions in a relatively diverse data definition environment is, perhaps, not impossible, but it is improbable. Further, the usual lack of clear-cut, long-term consortium goals makes the development of a common data base unlikely to be successful at this stage.

The primary elements in developing a productive exchange mechanism will be:

a. Comparable microcomputer equipment.
b. Common software.
c. Training.
d. A network for learning.

V. A PROPOSAL TO PURSUE

The conclusions of this study suggest that an aggressive effort ought to be made to bring the tools of consortium administration to a level parallel with that on the campuses. These tools should be developed and disseminated to match the level of priority that ought to be given to combining the resources of these campuses. In order to do this, a proposal for applying computer technology to this task is included as a part of this report.

A. OBJECTIVES.

The general goal of this project is to allow consortium staff to improve the effectiveness of their consortia by providing individuals in selected consortia with training and support in the use of computer applications relevant to interinstitutional decision-making. This goal is based on the now documented need for these organizations to catch up with the level of computer usage on their member campuses.

Well-informed, thoroughly developed analyses of consortium policy questions which are "manually" developed will often be affected by the level of sophistication member college personnel have with computer-based, decision-making at their own campuses. As the campuses become more expert in using their own data, consortium staff policy recommendations can rightly or wrongly be "tainted" by an aura of amateurism. An effort is needed to make consortium staff equally competent in the use of computerbased, decision support systems.

The specific objectives of this project will be:

1. To train two groups of 12 consortium staff members in the use of microcomputer-based, decision support systems and to aid these individuals in applying these resources to their most pressing problems.

2. To provide each consortium with a commonly configured microcomputer so the potential for information exchange among consortia can be enhanced.

3. To aid consortium directors to better utilize their local computer facilities and staff in meeting consortial goals.

4. To foster the creation of an inter-consortium network for computer applications development and sharing.

5. To monitor and disseminate information about the network and sharable models developed with other interested organizations.

B. PROGRAM DESIGN

1. Formation of 2 groups of consortium staff to receive DSS and microcomputer usage training. This project would begin in the spring of 1985 with the identification of 12 consortia willing to participate in the creation of this inter-consortium project. An invitation to participate will be sent to all members of the Council for Interinstitutional Leadership (C.I.L.) and to other consortia in the C.I.L. Directory. Additional notices of the project's inception will be sent to appropriate journals and newsletters to inform the higher education community about the project.

   The criteria to be used in making a selection from among all interested parties will include the following:

   a. The willingness of the participants to actively develop and disseminate replicable models for all consortia.

   b. The ability of the consortium to provide some matching money for hardware, software and travel.

   c. The ability of the participant to identify a local resource person who can provide on-going support and assistance to the individual being trained.

   d. The ability of the consortium to benefit from the use of computers in its operations.

   Another group of consortia to participate in the second year of the project will be identified in the fall of 1985.

   Although the invitation to apply for participation will be open, an effort will be made to include those consortia which, as a consequence of the original questionnaire, have already indicated a desire to do so. In the East this group includes:

   a. The Associated Colleges of the St. Lawrence Valley
   b. The Central Pennsylvania Consortium
   c. The Charleston Higher Education Consortium
   d. The Consortium for Continuing Education in Virginia
   e. The East Central College Consortium
   f. Educational Ventures, Inc.
   g. Graduate Council of N.Y.C.
   h. The Greater Cincinnati Consortium
   i. The Kentuckiana Metroversity
   j. Northeastern California Higher Education Council
   k. National Student and Faculty Exchange
   l. The Pittsburgh Council for Higher Education
   m. The South West Ohio Council for Higher Education
   n. The Valley of Virginia Consortium

   In the West positive responses came from:

   a. The Associated Colleges of the Twin Cities
   b. The Association for Higher Education in N. Texas

c. The Council of West Suburban Colleges
d. The Kansas City Regional Council for Higher Education
e. West Central Wisconsin Consortium
f. Southern Illinois Common Market
g. Council for Institutional Cooperation
h. North East California Higher Education Consortium
i. New Orleans Educational Technology Consortium
j. Quad Cities Graduate Studies Consortium

The first phase of the project will involve eastern consortia and the second, western. By reducing the geographic scope of two training groups, travel costs can be limited. Currently it is anticipated that training will be provided in Washington and Chicago, respectively.

Final selections of the participating consortia will be made by the project director, Dr. Fritz H. Grupe; the president of the Council for Interinstitutional Leadership (CIL), Dr. Fred Baus and the coordinator for C.I.L. activities, Ms. Terry LaRocca (American Council on Education).

C. TRAINING

The training for both phases will begin with a four-day training session which will focus on the usage of Lotus 1-2-3 (cited earlier), but which will provide an overview of other management-oriented software. The extensive capability of Lotus 1-2-3 makes it eminently satisfactory for many consortium applications. Lotus 1-2-3 was used to produce most of the tables and graphs for this report. It is relatively easy to learn and is the most popular managerial utility being sold.

The training will provide detailed instruction in the Lotus command structures, the design and preparation of high quality tables and graphs, and the use of advanced functions and complex macros, the uploading and downloading of files and the transfer of Lotus files into a data base management system (dBASE II). Sample worksheets such as those included in this report will be built and modified to demonstrate the ability of the participants to share and adapt models that they develop. Within a reasonable budget, Lotus 1-2-3 best fits the DSS criteria suggested by Geoffrin and Powers (p. 76) which are that, "An ideal support system is straightforward, easy to understand in functional terms, easy to interface with, and devoid of tedious or anxiety-producing requirements."

Unlike the more costly software development cycle associated with third generation software, DSS software like Lotus 1-2-3 is substantially less expensive and faster to make useful. Traditional EDP utilizes a life cycle that goes from extensive systems analysis and design, to coding and testing and, finally, to installation in a period lasting from 6 months to a year or more. DSS on the other hand uses a short "iterative" approach to development in which a serviceable and useful model is constructed rapidly (days or weeks) and is improved over time as needed. Models developed in the context of this project will be improved throughout the life of the project.

In addition to Lotus worksheets, initial demonstrations and training will be offered in the use of a data base manager (probably dBASE III) and a communications package (probably Crosstalk XVI).

The latter will be used to access electronic mail on a mainframe computer to be identified within one of the participating consortia. The electronic mail system will be used on a continuing basis. Each participant will be asked to check their electronic mail box and to communicate with the other participants about their consortium's developments generally, and about their use of computer modelling techniques specifically. Similarly, each participant can use electronic mail as a means of inquiry and information gathering to obtain solutions to their day-to-day problems.

After the initial training session, each participant will work with a locally identified resource person to develop locally effective computer models. The local resource person will enable the consortium director to continue to function productively despite any problems in model design they will inevitably encounter. Also, the project director will be available by electronic mail and telephone to provide assistance.

Each month the participants will send models they have developed, or substantially modified, to the project director. These models will be copied to the disks and redistributed to all of the participants.

Approximately seven months after the initial training the participants will re-convene for two days of added training and evaluation. During that session advanced problem-solving techniques will be explored and introductions to added software will be given. For instance, if there is substantial interest in using software specifically designed for statistical analysis, project management, time management or data base processing, attention will be directed to using these kinds of software.

To the extent that further training is desired, the participants can elect to continue to share information, to provide self-training, including voluntary assistance from the project director, and to extend their experience to other consortium directors in the second phase, or by attending and giving presentations at C.I.L. meetings.

D. HARDWARE AND ADDITIONAL SOFTWARE

It is viewed as essential that each participant have access to comparable hardware and software to facilitate both training and information interchange. At this time it appears to be appropriate to consider that an MS-DOS-based microprocessor be obtained by each participant; although other processors might be considered. This machine is common to most member campuses; it has a large base of software and it runs the core of software to be used in this project. Each microcomputer will have a minimum of 320 bytes of RAM (main memory) and 2 disk drives.

A 1200 baud "smart" modem and the Crosstalk XVI communications software will also be secured to enable the computers to talk with larger computers within each consortium and to access the machine providing electronic mail for project participants. A good-quality dot matrix printer capable of printing graphs and compressed-type reports on various sizes of computer paper will be another necessary component of the system.

Software for the project will include only Lotus 1-2-3 and Crosstalk. Other software may be obtained as the participants develop their capabilities for using the computers.

E. IMPACT OF THE PROJECT

This project promises to benefit all consortia by enabling the key administrators of these groups to become considerably more effective in their decision-making and in their ability to work with their boards of directors. The consortium officers can demonstrably apply this electronic technology to decisions in ways that are now largely ignored and ineffective.

Consortium applications using DSS-type software are ideal from many points of view. House (p. ix), for instance, states that DSS is most appropriate when (1) clear-cut goals exist; (2) procedures are well understood; (3) a few users with common goals are involved; and (4) a system operates independently of other systems. Consortia tend to focus on implementing discretely identifiable programs and projects that match these criteria and should, therefore, sponsor programs that are amenable to DSS analysis.

By tailoring training materials to consortium problems and by sharing consortium specific models, this project can undertake a task that cannot be undertaken as effectively on an individual basis. By initiating this project, the consortia will be able to upgrade their ability to assemble and interpret operational management information and decision support system data. The project will directly improve the management of an estimated total annual budget for the 24 consortia of over $6 million.

Further, by securing this concentrated and continuing exposure to the application of computers to problems involving consortia, the participants can begin to exercise some leadership in the use of this technology within their member campus. That is, by learning about such technologies as electronic mail and its utility for connecting consortia, the same medium will begin to be used more effectively for intra-consortium communications. Similarly, intra-consortium training of an equivalent nature for other administrators could be mounted. As the participants become more proficient they will be asked to survey their consortium's computer resources to determine whether opportunities for cooperation exist there.

As the survey of consortium directors demonstrated, not only is the need for this training needed, but it is desired and is not otherwise available.

Interim and final reports which include information about models applicable to all consortia will be disseminated. Prototype models can then be implemented at other consortia throughout the country, thereby reducing costs and improving management at, potentially, over 100 locations involving several hundred colleges and universities. The project director and participants will be available for professional conference presentations. Articles for professional journals and the ERIC system will be submitted.

F. PROJECT DIRECTOR

Dr. Fritz H. Grupe, Coordinator of Campus Computing Services at the University of Nevada Reno (UNR) will serve as the project director. He has been teaching

a variety of computer literacy workshops at UNR. This has included a well-regarded computer fluency project, not dissimilar from that proposed, which was organized for vice presidents, deans and directors of the University.

As the director of the Associated Colleges of the St. Lawrence Valley for 12 years and as a leading researcher, Dr. Grupe gained intimate familiarity with academic consortia throughtout the country. He has been a frequent presentor at consorium meetings and a consultant to many such groups. By combining his knowledge of computers with his knowledge of consortia, he will be able to assist the participants in solving their own problems. His resume is appended (E).

During the actual training sessions, a second person knowledgeable about Lotus 1-2-3 and other software will be retained to assist during the hands-on training sessions. This will enable all of the instruction to proceed smoothly.

G. BUDGET

A proposed budget is attached as Appendix C.

T4:3

APPENDIX A

POTENTIAL COOPERATIVE COMPUTER-RELATED PROGRAMS

1. Educational Discount Agreements
   a) For individuals and institutions
   b) Software and hardware

2. Faculty Development
   a) Teachers of computer programming
   b) Computer usage in disciplines
   c) Teachers of computer literacy
   d) Pre-service (college) faculty
   e) Stand alone workshops, conferences, etc.
   f) Television courses
   g) Encouragement of education as a career
   h) Certification or recommended standards for computer science teachers
   i) Summer industrial internships for faculty

3. Technical Support
   a) Terminal and microcomputer repair (agreements or provided service)
   b) Advice

4. Consultant Support
   a) Contract programming
   b) User group organization by
      -- software type
      -- microcomputer manufacturer
   c) Advisory service

5. Curriculum Development
   a) Computer literacy
   b) Computer mathematics
   c) Introduction to programming
   d) Advanced placement courses
   e) Enrichment courses/modules
   f) Computer project fairs/competitions
   g) Entrepreneurship program
   h) Guest lecturers in schools
   i) Career development fairs
   j) Computer exhibition circulation

6. Research on Educational Computing
   a) Educational equity
   b) Cognitive and affective outcomes

7. Centralized Facilities/Services
   a) Text processing center
      -- optical character reader
      -- laser printer
      -- other expensive device sharing
   b) Mini/mainframe computer
   c) Software library

d) Graphics laboratory with plotters, graphics tablets, digitizing canvas, etc.
e) Videotape and audio-visual library
f) Community cybernetic center
g) Educational unit with a Research Park

8. Networking
   a) Electronic mail/bulletin board
   b) Resource person lists
   c) Computer-based education conferences
   d) Newsletter
   e) Pilot project promotion
   f) Two-way CATV
   g) Videotex

9. Resource Enhancement
   a) Gift of equipment solicitation
   b) Grant writing
   c) Loan of staff and/or equipment from industry
   d) Revenue-producing activities

10. Computer Usage in Administration
   a) Training in decision support systems
   b) Support selected software packages
   c) Generate/promote new applications

11. Planning
   a) Technological futures study group
   b) Annual (written) plan for regional developments

T4:3

APPENDIX B: Survey Questionnaire

Please return by June 15, 1984 to:
Dr. Fritz H. Grupe
Coordinator of Computer Services
Room 200F, Clark Admin. Bldg.
University of Nevada Reno
Reno, NV 89557
(702-784-4636)

SURVEY OF
CONSORTIA AND COMPUTERS

1. What kinds of usage does your consortium now make of computers?

___ word processing
___ financial accounting
___ institutional data analysis
___ cross registration record keeping
___ statistical processing
___ mailing list handling
___ typesetting
___ none

___ electronic mail
___ data base searching management
___ spreadsheet reports
___ graphics
___ others (please list)
_____
_____
_____

2. How many of the following devices are now available to consortium staff in the consortium office?

___ word processor
___ terminal
___ printer
___ plotter

___ microprocessor
___ modem
___ other (please list)
_____
_____

Is the lack of immediate access to such equipment a restraint on your usage? Yes No

3. Do you have access to institutional mainframe computer services?

___ yes (free _____ charge basis _____)

___ no

4. Decision support systems such as VisiCalc and Lotus worksheets, graphics and report displays generally require that a problem can be largely, although not entirely, described quantitatively. Examples of such reports are institutional enrollment projections, program cost analyses, staff distribution reports, project budgets, telephone directories and mailing lists, statistical analyses and graphic summaries of quantitative data (e.g. pie and bar charts). Often such reports must be created on a cyclical basis. Do you have either computer or manually generated reports that illustrate how all consortia can use computer generated reports? Please share a sampling of 3 or 4 of these reports with me.

5. With which of the following programming languages and programming tools are you familiar?

___ Higher level language (Pascal, Fortran, Basic, Cobol, etc.)

___ Planning languages & systems (VisiCalc, Plantran, EFPM, Lotus, etc.)

___ Data base management systems (dBase II, Condor, etc.)

___ Statistical package (SPSS, BMD, SAS, etc.)

6. Have you ever taken a full-semester course in computer usage? yes no

7. Have any of your staff taken a full-semester course in computer usage? yes no

8. If it was possible to obtain partial foundation funding for a consortium director/staff training project aimed at making the use of microcomputers in consortium management more productive, would you

a)	participate in 1-2 weeks of training over 1-2 years?	yes	no	don't know
b)	share information about the models and approaches developed through the project?	yes	no	don't know
c)	think it likely that your consortium could provide up to $2,500 in matching funds toward the purchase of a microcomputer system with software and printer for your consortium,	yes	no	don't know
d)	think it likely that your consortium could provide part of the travel funds involved (say $750 of $3,000)? (This might be tied to a regular CIL meeting so costs could be contained.)	yes	no	don't know

APPENDIX C

COMPUTER PROJECT BUDGET

	1984-1985		1985-1986		TOTALS	
STAFF	FOUNDATION	MATCHING	FOUNDATION	MATCHING	FOUNDATION	MATCHING
PROJECT DIRECTOR	$5,600	$0	$5,600	$0	$11,200	$0
SECRETARY	1,200	0	1,200	0	2,400	0
CONSORTIUM STAFF	0	21,000	0	21,000	0	42,000
STUDENT ASSISTANTS	525	0	525	0	1,050	0
FRINGE BENEFITS	1,465	4,200	1,465	4,200	2,930	8,400
TRAVEL AND PER DIEM						
PARTICIPANT PER DIEM	6,300	0	6,300	0	12,600	0
PARTICIPANT TRAVEL	4,800	0	4,800	0	9,600	0
DIRECTOR PER DIEM	525	0	525	0	1,050	0
DIRECTOR TRAVEL	600	0	600	0	1,200	0
CONSULTANT	1,200	0	1,200	0	2,400	0
COMPUTER COSTS						
MICROCOMPUTER	19,980	9,990	19,980	9,990	39,960	19,980
PRINTER	9,000	0	9,000	0	18,000	0
LOTUS SOFTWARE	3,900	0	3,900	0	7,800	0
OTHER SOFTWARE	3,600	3,600	3,600	3,600	7,200	7,200
ONE YEAR MAINTENANCE	2,100	2,100	2,100	2,100	4,200	4,200
VAX TIME	3,000	0	3,000	0	6,000	0
OTHER						
CONSULTANTS	1,200	0	1,200	0	2,400	0
SUPPLIES	1,199	599	1,199	599	2,398	1,199
FURNITURE	2,100	2,100	2,100	2,100	4,200	4,200
BOOKS	600	0	600	0	1,200	0
REPRODUCTION	180	0	180	0	360	0
TELEPHONE	180	0	180	0	360	0
ACCOUNTING	3,463	2,179	3,463	2,179	6,925	4,359
TOTALS	$72,716	$45,769	$72,716	$45,769	$145,433	$91,538

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APPENDIX D: Summary of Responses to Questionnaire

	CONSORTIUM NAME	CURRENT USAGE										EQUIPMENT AVAILABLE									ACCESS			
		WORD	FIN. ACCT	INST RES.	CROSS REGIS	STAT PKG	MAIL LIST	TYPE SET	ELEC MAIL	D.B. MGT.	SPRD SHT.	GRPH	OTHR	WORD PROC	TERM	PRNT	PLOT	MICR	MDEM	OTHR	ACC.	MAIN	CHRG
1	ASSOC. COLLEGES OF THE ST. LAW. VAL	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
2	ASSOC. COLLEGES OF TWIN CITIES	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
3	ASSOC. FOR H. ED. OF N. TEXAS	1	1	0	0	1	1	1	1	0	1	1	0	1	1	1	0	1	1	0	1	1	1
4	CENTRAL PENNA. CONSORTIUM	1	1	0	0	1	1	0	0	0	1	0	0	1	1	1	0	1	0	0	0	1	0
5	CHARLESTON H. ED. CONSORTIUM	1	1	0	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	0
6	COLLEGE CTR. OF FINGER LAKES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	COMMITTEE ON INST. COOPERATION	1	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0	1	1	1
8	CONS. OF UNIV. OF WASHINGTON	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1	1	1
9	CONSORTIUM FOR CONTIN. ED. IN VA.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
10	CONSORTIUM ON FINANCING H. ED.	1	1	1	0	0	1	0	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1
11	COOP. COLLEGES OF SPRINGFIELD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
12	COUNCIL OF W. SUBURBAN COLLEGES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
13	EAST CENTRAL COLLEGE CONSORTIUM	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
14	EDUCATIONAL VENTURES	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
15	FIVE COLLEGES	1	1	0	0	0	1	0	1	0	1	0	0	1	1	1	0	0	1	0	1	1	0
16	GRAD. STUDY COUNCIL OF N. Y. C.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
17	GREAT LAKES COLLEGES ASSOC.	1	1	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	1	0	0	0	0
18	GREATER CINCINNATI CONSORTIUM	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
19	HUDSON - MOHAWK ASSOC. OF C. & U.	0	0	0	0	0	1	0	0	1	1	0	0	0	1	1	0	0	1	0	0	1	1
20	KANSAS CITY CONSORTIUM FOR H. ED.	1	0	0	0	1	1	0	1	0	1	0	1	1	1	1	0	1	1	0	0	1	0
21	KENTUCKIANA METROVERSITY	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1
22	MILLIKAN GRAD. STUD. CTR.	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0
23	N .E .E .C .U. M.	1	1	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0
24	N. E. CALIF. H. ED. COUNCIL	1	1	0	0	0	1	0	0	1	1	0	0	1	0	1	0	1	1	0	1	1	1
25	NAT. STUD/FAC EXCHANGE	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
26	NEW HAMPSHIRE C. & U. COUNCIL	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1
27	NEW ORLEANS ED. TELECOMM. CONSORTIU	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
28	OHIO COLLEGE ASSOC.	1	1	1	0	1	1	0	0	1	1	0	0	3	0	2	0	0	0	0	1	0	0
29	PITTSBURGH COUNCIL FOR H. ED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
30	QUAD CITIES GRADUATE STUDIES CENTER	1	1	1	0	0	1	0	0	0	1	1	0	1	1	1	0	0	0	0	0	1	1
31	S. ILLINOIS COMMON MARKET	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
32	S. W. OHIO COUNCIL FOR H. ED.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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KNOWLEDGE LEVEL						PROJECT INTEREST			
H.L. LANG	PLAN LANG	D.B. MGT.	STAT PKG.	PERS CRSE	STAF CRSE	PART	SHARE	EQUP MTCH	TRVL MTCH
0	0	0	0	0	0	1	1	3	1
1	0	0	0	0	0	1	1	3	3
1	1	0	1	1	1	1	1	1	1
0	0	0	0	0	0	1	1	1	1
1	0	0	0	0	0	3	1	3	1
0	0	0	0	0	0	3	3	3	3
1	1	1	1	0	0	3	1	1	1
0	0	0	0	0	0	3	1	2	3
0	0	0	0	0	1	1	1	2	3
1	1	0	1	0	0	3	3	2	3
0	0	0	0	0	0	2	2	2	2
1	0	0	0	0	0	1	1	3	3
1	0	1	0	1	0	1	1	3	3
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1	1	1	1	0	1	3	3	3	3
1	1	0	1	0	1	1	1	3	3
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0	0	0	1	0	0	1	1	2	1
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1	1	1	0	0	1	1	1	3	3
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0	0	0	0	0	0	1	1	1	1
0	1	0	0	0	1	3	1	3	3
0	0	1	1	0	0	1	1	1	3
0	1	1	1	0	1	2	2	2	2
0	0	0	1	0	0	1	1	1	1
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0	0	0	0	0	1	1	1	3	1
0	1	1	0	0	0	1	1	3	3
1	0	0	0	1	0	3	3	3	3
0	0	0	0	0	1	1	1	1	1

	CONSORTIUM NAME	CURRENT USAGE							EQUIPMENT AVAILABLE											ACCESS			
		WORD	FIN. ACCT	INST RES.	CROSS REGIS	STAT PKG	MAIL LIST	TYPE SET	ELEC MAIL	D.B. MGT.	SPRD SHT.	GRPH	OTHR	WORD PROC	TERM	PRNT	PLOT	MICR	MDEM	OTHR	ACC.	MAIN	CHRG
33	SAN FRANCISCO CONSORTIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
34	STATEN IS. COOP. CONTINUUM OF ED.	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	0
35	VALLEY OF VIRGINIA CONSORTIUM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	W. CENTRAL WISCONSIN CONSORTIUM	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1
37	WORCHESTER CONSORTIUM FOR H. ED.	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1
TOTALS	37	23	19	7	6	8	19	4	9	6	14	6	3	21	18	21	3	13	12	1	13	27	17
		62%	51%	19%	16%	22%	51%	11%	24%	16%	38%	16%	8%	57%	49%	57%	8%	35%	32%	3%	35%	73%	46%

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KNOWLEDGE LEVEL						PROJECT INTEREST			
H.L. LANG	PLAN LANG	D.B. MGT.	STAT PKG.	PERS CRSE	STAF CRSE	PART	SHARE	EQUP MTCH	TRVL MTCH
0	0	0	0	0	0	3	1	3	3
1	0	1	0	0	0	2	1	1	1
0	0	0	0	0	0	1	1	1	3
1	1	0	1	0	1	1	3	3	1
0	0	0	1	0	0	3	3	2	1
14	12	9	13	3	11				
38%	32%	24%	35%	8%	30%				

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APPENDIX F

IMPROVING PRODUCTIVITY - DECISION SUPPORT SYSTEMS

Alter, S. "A Taxonomy of Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 33-56.

Alter, S. "Why is Man-Computer Interaction Important for Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 157-166.

Baxter, J. D. "Line Managers Move from MIS to DSS for Decision-Making Help," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 57-64.

Bloomfield, S. D. and Updegrove, D. A. "Modeling for Insight, Not Numbers," EDUCOM Bulletin, Vol. 17, No. 3, Fall 1982, pp. 5-9.

Bonczek, R. H.; Holsapple, C. W. and Whinstone, A. B., "Computer-Based Support of Organization Decision Making," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 291-323.

Bonczek, R. H.; Holsapple, C. W. and Whinstone, A. B., "The Evolving Roles of Models in Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 343-369.

Carlson, E. D. "An Approach for Designing Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 125-155.

Cobb, D. F. and Anderson, L. 1-2-3 For Business, Que Corporation, 1984, 338 pp.

Davis, G. B., "Strategies for Information Requirements Determination," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 189-225.

Durway, J. W., "Sensitivity Analysis and Simulation," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 433-441.

Geoffrion, A. M. and Powers, R. F., "Management Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 65-84.

Keen, P. G. W. and Wagner, G. R., "DSS: An Executive Mind-Support System," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 325-341.

Keen, P. G. W., "Decision Support Systems: Translating Analytic Techniques into Useful Tools," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 371-390.

Keen, P. G. W., "Interactive Computer Systems for Managers: A Modest Proposal," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 167-187.

LeBlond, G. T. and Cobb, D. F. Using 1-2-3, Que Corporation, 1983, 421 pp.

Larre'che', J.-C. and Srinivasan, V. "Stratoport: A System for Strategic Planning," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 391-419.

Mason, R. O.; and Swanson, E. B. Measurement for Management Decision, Addison-Wesley, 1981, 550 pgs.

McKenney, J. L. and Keen, P. G. W., "How Managers' Minds Work," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 249-269.

Robey, D and Taggart W., "Human Information Processing in Information and Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 271-289.

Sprague, R. H., Jr. "A Framework for the Development of Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 85-123.

Sprague, R. H., Jr. and Watson, H. J. "Bit by Bit: Toward Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pg.

Thierauf, R. J. Decision Support Systems for Effective Planning and Control, Prentice-Hall, 1982, 536 pgs.

Wagner, G. R. "Optimizing Decision Support Systems," in Decision Support Systems, (W. C. House, ed.), Petrocelli Books, New York, 1983, pp. 421-433. Addison-Wesley, 1981, 550 pgs.

Thierauf, R. J. Decision Support Systems for Effective Planning and Control, Prentice-Hall, 1982, 536 pgs.